Simulated Self Organisation of a Peer to Peer Awareness Network

The Historical Awareness Approach

David Nutter

dnutter@hemswell.lincoln.ac.uk+

Introduction

Historical Awareness:

> The complete context of an artefact's creation, derived from a collection of heterogenous artefacts (source code, design etc) rather than a contextless view of a single artefact's evolution.

Therefore, certain elements of information must be presented to the user in a non-intrusive manner:

- Details of previous artefact conflicts
- "Proximity" of recent user activity
- Artefacts related to current focus
- Any relevant change information

Goals

The awareness project has the following goals:

- To provide a contextual view of artefacts' creation
- To experiment with a reflector-free distribution model for CSCW
  - Provides robustness
  - Ease of setup (flexibility, default local broadcast discovery)
- To provide integration with an existing development environment for evaluation
- Evaluation driven implementation.

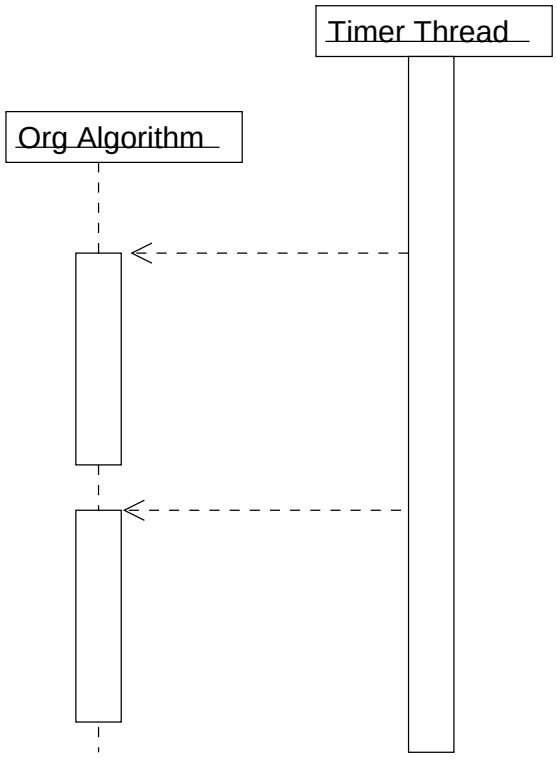
Algorithm & Rationale

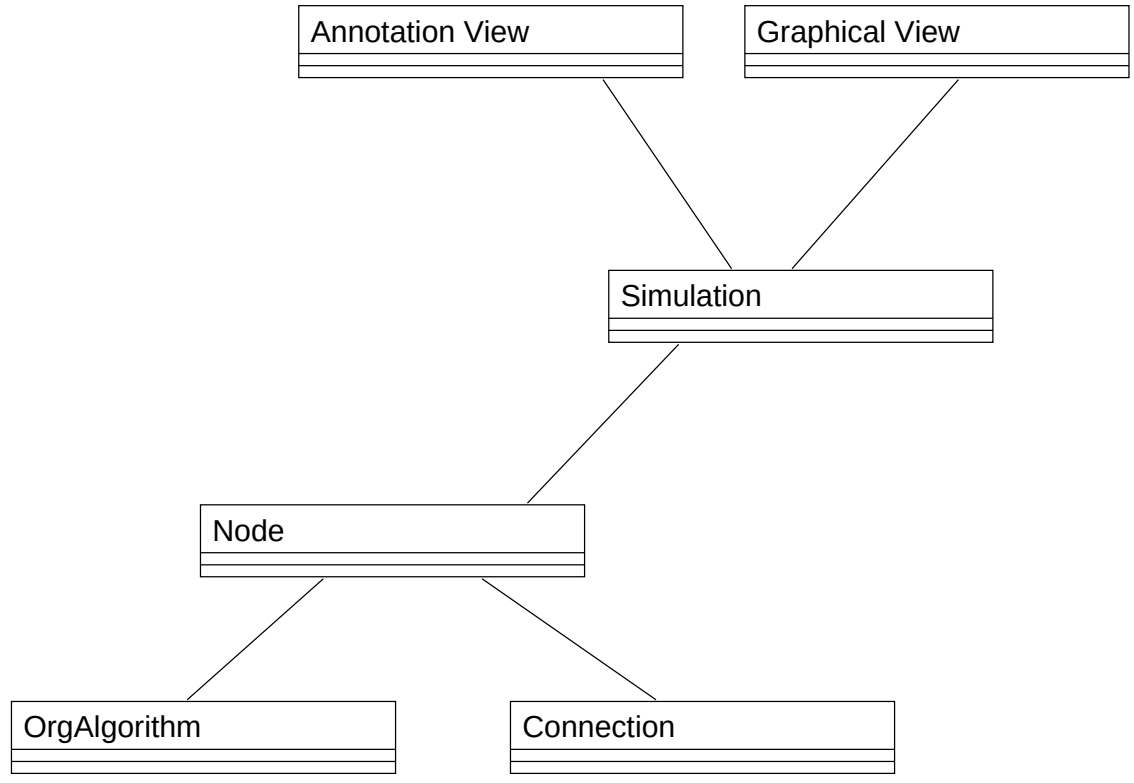
An example of the self-organisation algorithm:

$$Peer\ A \xrightarrow{connect} Peer\ B$$
$$Peer\ A \xrightarrow{send\ details\ of\ A} Peer\ B$$
$$Peer\ B \xrightarrow{send\ details\ of\ A} Peer\ C$$
$$Peer\ B \xrightarrow{send\ details\ of\ A} Peer\ D$$
$$Peer\ B \xrightarrow{reconnect\ D} Peer\ A$$
$$Peer\ A \xleftarrow{disconnect} Peer\ B$$
$$Peer\ A \xrightarrow{connect} Peer\ D$$

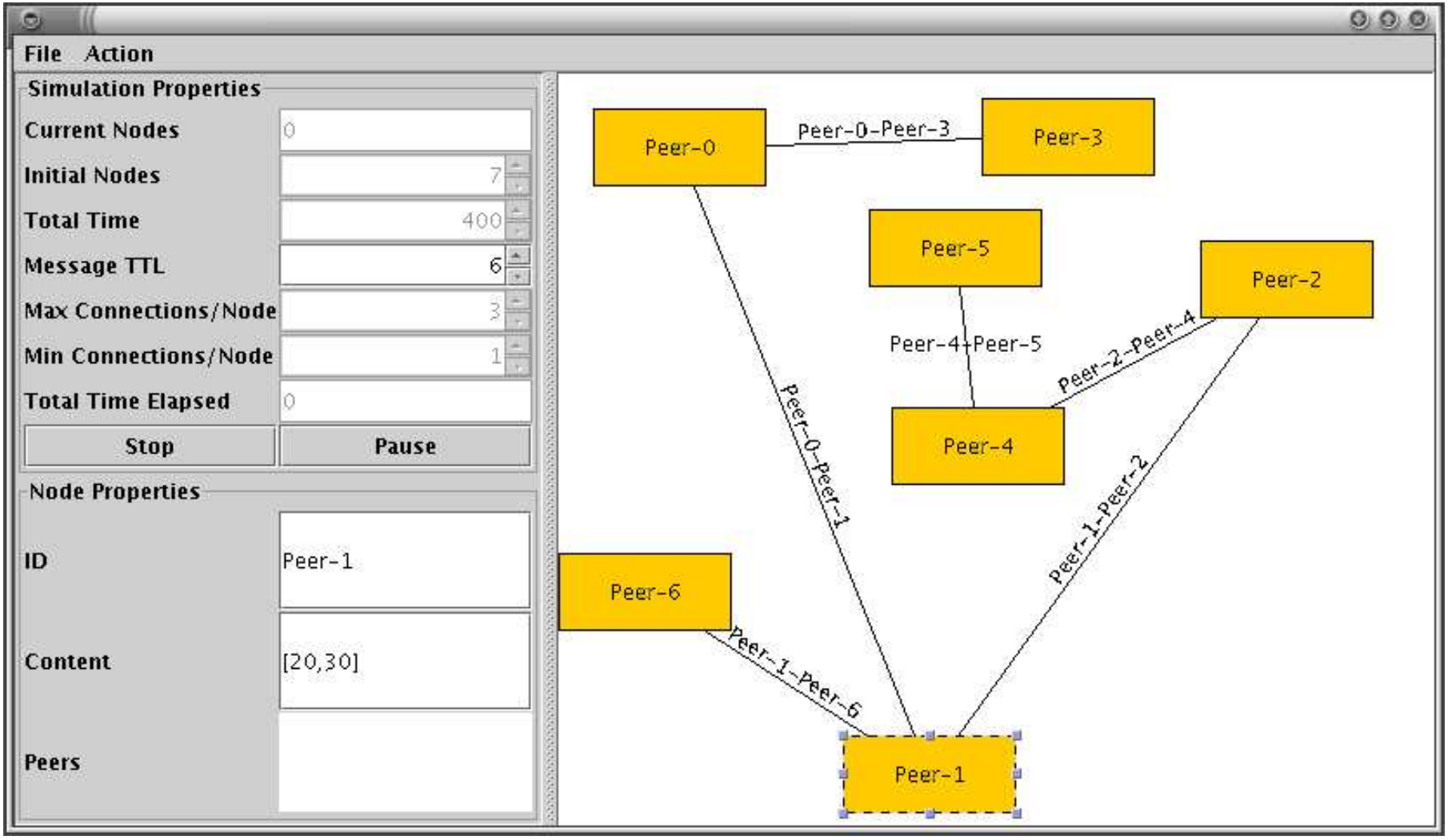
- This algorithm is iterative
- It is not immune to local minima
- However, it consequently requires no global state

Architecture





Screenshot


File Action
Simulation Properties
Current Nodes
0
Initial Nodes
7
Total Time
400
Message TTL
6
Max Connections/Node
3
Min Connections/Node
1
Total Time Elapsed
0
Stop
Pause
Node Properties
ID
Peer-1
Content
[20,30]
Peers
Peer-0
Peer-0-Peer-3
Peer-3
Peer-5
Peer-2
Peer-4-Peer-5
Peer-2-Peer-4
Peer-4
Peer-0-Peer-1
Peer-1-Peer-2
Peer-6
Peer-1-Peer-6
Peer-1